CLAIMS

1.   A network adapter that may be used in a network data storage system to permit data communication among data exchanging devices and a data storage system input/output (I/O) controller, the controller residing in the data storage system, the data exchanging devices being external to the adapter, the adapter comprising:

one or more interfaces that may be coupled to an electrical backplane of the system, the backplane being coupled to the controller and being configured to permit communication between the controller and the adapter when the one or more interfaces are coupled to the backplane; and

a switching system integrated into the adapter, the switching system having a first set of ports that may be coupled to the data exchanging devices and a second set of ports that may couple the switching system to the controller when the one or more interfaces are coupled to the backplane.

2.   The adapter of claim 1, wherein the one or more interfaces comprise at least one interface through which a command may be issued to the adapter to cause the adapter to change from an operational mode to a diagnostic mode.

3.   The adapter of claim 1, wherein the data storage system comprises a set of mass storage devices that may exchange data with the data exchanging devices via the adapter.

4.   The adapter of claim 1, wherein the adapter is assigned a network layer address based at least partially upon a slot identification number that identifies a location in the data storage system in which the adapter resides.

5.   The adapter of claim 1, wherein the switching system comprises a fibre

channel switching fabric.

6.   The adapter of claim 1, wherein the one or more interfaces comprise a

management interface through which the controller may issue via the backplane a

5   command to the adapter.

7.   The adapter of claim 1, wherein the one or more interfaces permit a processor

to issue a command to the adapter via the backplane, the processor being external to

the data exchanging devices, the adapter, and the controller.

8.   The adapter of claim 7, wherein the processor is external to the data storage

10   system.

9.   The adapter of claim 7, wherein a first network address of the adapter may be

changed during a configuration of the data storage system to a second network

address, the processor being coupled to the adapter via a network, the adapter being

accessible via the network using the second network address.

15   10.   The adapter of claim 1, wherein the one or more interfaces include a first

interface and a second interface, the first interface permitting the controller to issue a

first command to the adapter for causing the adapter to change from a first mode of

operation to a second mode of operation, the second interface permitting

configuration-related information to be retrieved from a non-volatile memory

20   comprised in the adapter.

11.   The adapter of claim 10, wherein in the second mode of operation, a

diagnostic test of the adapter is performed.

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12. The adapter of claim 11, wherein the diagnostic test comprises one of a built-in self-test (BIST) of the adapter and a different test of the adapter, the different test including transmission of a test vector along a first test path in the adapter, the test path beginning and ending at a first I/O port that couples the adapter to the controller

5 when the one or more interfaces are coupled to the backplane, the test path including a subset of the first set of ports of the switching system.

13. The adapter of claim 12, wherein the different test also includes the transmission of a test vector along a second test path in the adapter, the second test path beginning and ending at a different I/O port that couples the adapter to the

10 controller when the one or more interfaces are coupled to the backplane, the second test path including a different subset of the first set of ports of the switching system.

14. The adapter of claim 1, wherein the adapter is an electrical circuit card that is configured to be electrically and mechanically coupled to the backplane.

15. A circuit card configured to be inserted into and received by a circuit card slot

15 in a network data storage system, the card comprising:

one or more interfaces that may be coupled via signal transmission system of the data storage system to an input/output (I/O) controller of the data storage system when the card is inserted into the slot, the one or more interfaces permitting communication between the controller and the card when the one or more interfaces

20 are coupled to the controller; and

a switch having a first set of ports that may be coupled to data exchanging devices external to the card and the data storage system, and a second set of ports that may couple the switch to the controller when the card is inserted into the slot.

16. The card of claim 15, wherein the one or more interfaces comprise a first interface, a second interface, and a third interface, the first interface permitting a processor that is external to the card and the controller to issue a command to the card, the second interface permitting the controller to issue a diagnostic command to

5   the card, and the third interface permitting configuration-related information to be retrieved from a non-volatile memory comprised in the card.

17. The card of claim 16, wherein the diagnostic command causes the card to execute a diagnostic test of the card, the test comprising one of a built-in self-test (BIST) and a different test, the different test including transmission of test vectors

10   along a first test path in the card, the test path beginning and ending at a first I/O port that couples the card to the controller when the card is inserted in the slot, the test path including a subset of the first set of ports of the switch.

18. A method of using a network adapter in a network data storage system to permit data communication among data exchanging devices and a data storage system

15   input/output (I/O) controller, the controller residing in the data storage system, the data exchanging devices being external to the adapter, the adapter including one or more interfaces and a switching system, the method comprising:

coupling the one or more interfaces to an electrical backplane of the system, the backplane being coupled to the controller and being configured to permit

20   communication between the controller and the adapter when the one or more interfaces are coupled to the backplane;

coupling a first set of ports of the switching system to the data exchanging devices; and

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coupling a second set of ports of the switching system to the controller.

19.   The method of claim 18, further comprising issuing a command through at least one interface of the one or more interfaces, the command being for causing the adapter to change from an operational mode to a diagnostic mode.

5   20.   The method of claim 18, wherein the data storage system comprises a set of mass storage devices that may exchange data with the data exchanging devices via the adapter.

21.   The method of claim 18, further comprising assigning a network layer address to the adapter based at least partially upon a slot identification number that identifies

10   a location in the data storage system in which the adapter resides.

22.   The method of claim 18, wherein the switching system comprises a fibre channel switching fabric.

23.   The method of claim 18, wherein the one or more interfaces comprise a management interface, and the method also comprises issuing from the controller a

15   command to the adapter via the backplane.

24.   The method of claim 18, wherein the one or more interfaces permit a processor to issue a command to the adapter via the backplane, the processor being external to the data exchanging devices, the adapter, and the controller.

25.   The method of claim 24, wherein the processor is external to the data storage

20   system.

26.   The method of claim 24, wherein a first network address of the adapter may be changed during a configuration of the data storage system to a second network

address, the processor being coupled to the adapter via a network, the adapter being

accessible via the network using the second network address.

27.   The method of claim 18, wherein the one or more interfaces include a first

interface and a second interface, the first interface permitting the controller to issue a

5   first command to the adapter for causing the adapter to change from a first mode of

operation to a second mode of operation, the second interface permitting

configuration-related information to be retrieved from a non-volatile memory

comprised in the adapter.

28.   The method of claim 27, further comprising, causing the adapter to change

10   from the first mode of operation to the second mode of operation, and when the

adapter is in the second mode of operation, performing a diagnostic test of the

adapter.

29.   The method of claim 28, wherein the diagnostic test comprises one of a built-

in-self-test (BIST) of the adapter and a different test of the adapter, the different test

15   including transmission of a test vector along a first test path in the adapter, the test

path beginning and ending at a first I/O port that couples the adapter to the controller

when the one or more interfaces are coupled to the backplane, the test path including

a subset of the first set of ports of the switching system.

30.   The method of claim 29, wherein the different test also includes the

20   transmission of a test vector along a second test path in the adapter, the second test

path beginning and ending at a different I/O port that couples the adapter to the

controller when the one or more interfaces are coupled to the backplane, the second

test path including a different subset of the first set of ports of the switching system.

31.   The method of claim 18, wherein the adapter is an electrical circuit card that is

configured to be electrically and mechanically coupled to the backplane.

32.   A method of using a circuit card that is configured to be inserted into and

received by a circuit card slot in a network data storage system, the card including

5   one or more interfaces and a switch, the method comprising:

inserting the card into the slot, the inserting of the card into the slot coupling

the one or more interfaces of the card to a signal transmission system in the data

storage system that permits communication between the controller and the card;

coupling a first set of ports of the switch to data exchanging devices external

10   to the card and the data storage system; and

coupling a second set of ports of the switch to the controller via the

transmission system.

33.   The method of claim 32, wherein the one or more interfaces comprise a first

interface, a second interface, and a third interface, the first interface permitting a

15   processor that is external to the card the controller to issue a command to the card, the

second interface permitting the controller to issue a diagnostic command to the card,

and the third interface permitting configuration-related information to be retrieved

from a non-volatile memory comprised in the card.

34.   The method of claim 33, wherein the diagnostic command causes the card to

20   execute a diagnostic test of the card, the test comprising one of a built-in self-test

(BIST) and a different test, the different test including transmission of a test vector

along a first test path in the card, the test path beginning and ending at a first I/O port

that couples the card to the controller when the card is inserted in the slot, the test

path including a subset of the first set of ports of the switch.